

SLOVENSKI STANDARD
oSIST prEN ISO 10439-1:2010
01-december-2010

Petrokemična industrija ter industrija za predelavo nafte in zemeljskega plina - Aksialni, radialni in ekspanzijski kompresorji - 1. del: Splošne zahteve (ISO/DIS 10439-1:2010)

Petroleum, petrochemical and natural gas industries - Axial and centrifugal compressors and expander-compressors - Part 1: General requirements (ISO/DIS 10439-1:2010)

Erdöl-, petrochemische und Erdgasindustrie - Axial- und Radialkompressoren und Expanderkompressoren für Sonderanwendungen zur Handhabung von Gas oder Prozessluft - Teil 1: Allgemeine Anforderungen (ISO/DIS 10439-1:2010)

Industries du pétrole, de la pétrochimie et du gaz naturel - Compresseurs axiaux et centrifuges et compresseurs-détenteurs - Partie 1: Exigences générales (ISO/DIS 10439-1:2010)

Ta slovenski standard je istoveten z: prEN ISO 10439-1

ICS:

23.140	Kompresorji in pnevmatični stroji	Compressors and pneumatic machines
75.180.20	Predelovalna oprema	Processing equipment

oSIST prEN ISO 10439-1:2010

en,fr

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN ISO 10439-1

October 2010

ICS 75.180.20; 71.120.99

Will supersede EN ISO 10439:2002

English Version

Petroleum, petrochemical and natural gas industries - Axial and centrifugal compressors and expander-compressors - Part 1: General requirements (ISO/DIS 10439-1:2010)

Industries du pétrole, de la pétrochimie et du gaz naturel - Compresseurs axiaux et centrifuges et compresseurs-détenteurs - Partie 1: Exigences générales (ISO/DIS 10439-1:2010)

Erdöl-, petrochemische und Erdgasindustrie - Axial- und Radialkompressoren und Expanderkompressoren für Sonderanwendungen zur Handhabung von Gas oder Prozessluft - Teil 1: Allgemeine Anforderungen (ISO/DIS 10439-1:2010)

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 12.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
Foreword.....	3

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 10439-1:2015

<https://standards.iteh.ai/catalog/standards/sist/71e5b890-2dcf-4c73-b06d-c764f947bd51/sist-en-iso-10439-1-2015>

Foreword

This document (prEN ISO 10439-1:2010) has been prepared by Technical Committee ISO/TC 118 "Compressors and pneumatic tools, machines and equipment" in collaboration with Technical Committee CEN/TC 12 "Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries" the secretariat of which is held by AFNOR.

This document is currently submitted to the parallel Enquiry.

This document will supersede EN ISO 10439:2002.

Endorsement notice

The text of ISO/DIS 10439-1:2010 has been approved by CEN as a prEN ISO 10439-1:2010 without any modification.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 10439-1:2015](https://standards.iteh.ai/catalog/standards/sist/71e5b890-2dcf-4c73-b06d-c764f947bd51/sist-en-iso-10439-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/71e5b890-2dcf-4c73-b06d-c764f947bd51/sist-en-iso-10439-1-2015>



DRAFT INTERNATIONAL STANDARD ISO/DIS 10439-1

ISO/TC 118/SC 1

Secretariat: NEN

Voting begins on:
2010-10-07Voting terminates on:
2011-03-07

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Petroleum, petrochemical and natural gas industries — Axial and centrifugal compressors and expander-compressors —

Part 1: General requirements

Industries du pétrole, de la pétrochimie et du gaz naturel — Compresseurs axiaux et centrifuges et compresseurs-détenteurs —

Partie 1: Exigences générales

iTeh STANDARD PREVIEW
(standards.iteh.ai)

(Revision in part of ISO 10439:2002)

ICS 71.120.99; 75.180.20

SIST EN ISO 10439-1:2015

<https://standards.iteh.ai/catalog/standards/sist/71e5b890-2dcf-4c73-b06d-c764f947bd51/sist-en-iso-10439-1-2015>

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

ISO/DIS 10439-1

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN ISO 10439-1:2015](https://standards.iteh.ai/catalog/standards/sist/71e5b890-2dcf-4c73-b06d-c764f947bd51/sist-en-iso-10439-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/71e5b890-2dcf-4c73-b06d-c764f947bd51/sist-en-iso-10439-1-2015>

Copyright notice

This ISO document is a Draft International Standard and is copyright-protected by ISO. Except as permitted under the applicable laws of the user's country, neither this ISO draft nor any extract from it may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission being secured.

Requests for permission to reproduce should be addressed to either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Reproduction may be subject to royalty payments or a licensing agreement.

Violators may be prosecuted.

Contents

Page

Foreword.....	v
Introduction.....	vi
1 Scope	1
2 Normative References	1
3 Terms, Abbreviated terms and Definitions	3
3.1 Terms and definitions.....	3
3.2 Abbreviated terms	9
4 General.....	10
4.1 Dimensions and Units	10
4.2 Statutory Requirements	10
4.3 Unit Responsibility	10
4.4 Basic Design	11
4.5 Materials	13
4.6 Casings	18
4.7 Rotating Elements	26
4.8 Dynamics	28
4.9 Bearings and Bearing Housings	46
4.10 Shaft and Seals	47
4.11 Integral Gearing	50
4.12 Nameplates and Rotation Arrows	50
5 Accessories.....	50
5.1 Drivers and Gearing.....	50
5.2 Couplings and Guards	51
5.3 Lubrication and Sealing Systems	51
5.4 Mounting Plates	52
5.5 Controls and Instrumentation	56
5.6 Piping and Appurtenances	58
5.7 Special Tools.....	59
6 Inspection, Testing and Preparation for Shipment	59
6.1 General.....	59
6.2 Inspection	59
6.3 Testing	61
6.4 Preparation for Shipment.....	65
7 Vendor's Data.....	66
7.1 General.....	66
7.2 Proposals.....	68
7.3 Contract Data	70
Annex A (normative) Procedure for the determination of residual unbalance.....	73
Annex B (informative) Typical shaft end seals.....	94
Annex C (normative) Requirements for lateral analysis reports.....	103
Annex D (normative) Requirements for torsional analysis reports	109
Annex E (normative) Magnetic bearings.....	113
Annex F (normative) Dry gas seal testing at manufacturer's shop	128
Annex G (informative) Guidelines for anti-surge systems.....	130

ISO/DIS 10439-1:2010

Annex H (informative) Typical bid tab template	131
Bibliography	143

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 10439-1:2015

<https://standards.iteh.ai/catalog/standards/sist/71e5b890-2dcf-4c73-b06d-c764f947bd51/sist-en-iso-10439-1-2015>

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 10439-1 was prepared by Technical Committee ISO/TC 118, *Compressors and pneumatic tools, machines and equipment*, Subcommittee SC 1, *Process compressors*, in collaboration with Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 6, *Processing equipment and systems*.

This second edition cancels and replaces the first edition (ISO 10439:2002), which has been technically revised and split into four (4) parts.

ISO 10439 consists of the following parts, under the general title *Axial and centrifugal compressors and expander-compressors for special purpose applications handling gas of process air for petroleum, petrochemical and natural gas industries*:

Part 1: General requirements

Part 2: Non-integrally geared centrifugal and axial compressors

Part 3: Integrally geared centrifugal compressors

Part 4: Expander-compressors

ISO/DIS 10439-1:2010**Introduction**

This International Standard is based on the 7th edition of the American Petroleum Institute standard API 617.

Users of this International Standard should be aware that further or differing requirements may be needed for individual applications. This International Standard is not intended to inhibit a vendor from offering, or the purchaser from accepting alternative equipment or engineering solutions for the individual application. This may be particularly appropriate where there is innovative or developing technology. Where an alternative is offered, the vendor should identify any variations from this International Standard and provide details.

A Bullet (●) at the beginning of a clause or subclause indicates that either a decision is required or further information is to be provided by the purchaser. This information should be indicated on data sheets or stated in the enquiry or purchase order (see examples in ISO 10439-2 Annex A, ISO 10439-3 Annex A and ISO 10439-4 Annex A).

In this International Standard, where practical, US Customary units are included in parentheses for information.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 10439-1:2015

<https://standards.iteh.ai/catalog/standards/sist/71e5b890-2dcf-4c73-b06d-c764f947bd51/sist-en-iso-10439-1-2015>

Petroleum, petrochemical and natural gas industries — Axial and centrifugal compressors and expander-compressors —

Part 1:

General requirements

1 Scope

This International Standard specifies minimum requirements and gives recommendations for axial compressors, single-shaft and integrally geared process centrifugal compressors and expander-compressors for special purpose applications that handle gas or process air in the petroleum, petrochemical and natural gas industries. This part of ISO 10439 specifies general requirements applicable to all such machines.

ISO 10439 does not apply to fans (these are covered by API STD 673) or blowers that develop less than 34 kPa (5 psi) pressure rise above atmospheric pressure. ISO 10439 also does not apply to packaged, integrally-gear centrifugal plant and instrument air compressors, which are covered by API STD 672. Hot gas expanders over 300 °C (570 °F) are not covered by ISO 10439.

This part of ISO 10439 contains information pertinent to all equipment covered by the other parts of ISO 10439. It shall be used in conjunction with the following parts of ISO 10439, as applicable to the specific equipment covered:

Part 2 — Non-integrally geared centrifugal and axial compressors

Part 3 — Integrally geared centrifugal compressors

Part 4 — Expander-compressors

2 Normative References

2.1 The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 261, *ISO general purpose metric threads, General plan*

ISO 262, *ISO general Purpose Metric Screw Threads – Selected Sizes for Screws, Bolts and Nuts*

ISO 724, *ISO general Purpose Metric Screw Threads – basic dimensions*

ISO 965, *ISO general purpose metric screw threads (all parts)*

ISO 6708:1995, *Pipework Components – Definition and Selection of DN (Nominal Size)*

ISO 7005-1:1992, *Metallic Flanges – Part 1: Steel Flanges*

ISO 7005-2:1992, *Metallic Flanges – Part 2: Cast Iron Flanges*

ISO 8821:1989, *Mechanical Vibration – Balancing – Shaft and Fitment Key Convention*

ISO 10438:2007 (all parts), *Petroleum, petrochemical and natural gas industries – Lubrication, shaft-seating and oil-control systems and auxiliaries*. (identical to API STD 614 5th edition)

ISO/DIS 10439-1:2010

ISO 10441:2007, *Petroleum, petrochemical and natural gas industries – Flexible couplings for mechanical power transmission – Special Purpose applications*

ISO 14839-1:2002, *Mechanical Vibration – Vibration of Rotating Machinery Equipped with Active Magnetic Bearings – Part 1: Vocabulary*

ISO 14839-3:2007, *Mechanical Vibration – Vibration of Rotating Machinery Equipped with Active Magnetic Bearings – Part 3: Evaluation of stability margin*

ISO 15156-3:2008, *Petroleum and natural gas industries – Materials for use in H₂S containing environments in oil and gas production – Part 3: Cracking resistant CRAs (corrosion resistant alloys) and other alloys (Identical to NACE MR0175-2008)*

IEC 60079-10-1, *Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres*

EN 55011:2007, *Industrial scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement*

EN 61000-6-2:2006, *Electromagnetic compatibility (EMC) – Part 6-2: generic standards – Immunity for industrial environments*

API STD 613, *Special Purpose Gear Units For Petroleum, Chemical, and Gas Industry Services*

ASME B1.1, *Unified Inch Screw Threads (UN and UNR Thread Form)*

ASME B16.1, *Gray Iron pipe Flanges and Flanged Fittings (Classes 25, 125, and 250)*

ASME B16.42, *Ductile Iron Pipe Flanges and Flanged Fittings Classes 150 and 300*

ASME B16.47, *Large Diameter Steel Flanges NPS 26 Through NPS 60 Metric/Inch Standard*

ASME B16.5, *Pipe Flanges and Flanged Fittings NPS ½ Through NPS 24 Metric/Inch Standard*

ASTM A-247, *Standard Test Method for Evaluating the Microstructure of Graphite in Iron Castings*

ASTM A-278, *Standard Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650 °F (350 °C)*

ASTM A-395, *Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures*

ASTM A-536, *Standard Specification for Ductile Iron Castings*

ASTM E709, *Standard Guide for Magnetic Particle Testing*

ASTM E 125, *Standard Reference Photographs for Magnetic Particle Indications on Ferrous Castings*

AWS D1.1, *Structural Welding Code*

NACE MR0103-2007, *Standard Material Requirements – Material Resistant to Sulfide Stress Cracking in Corrosive Petroleum Refining Environments*

NACE MR0175-2008, *Petroleum and natural gas industries – Materials for use in H₂S containing environments in oil and gas production – Part 3: Cracking resistant CRAs (corrosion resistant alloys) and other alloys (Identical to ISO 15156-3)*

NACE SP0472-2008, *Methods and Controls to Prevent In-Service Environmental Cracking of Carbon Steel Weldments in Corrosive Petroleum Refining Environments*

NFPA 70:2008, *National Electrical Code*

• **2.2 The hierarchy of documents shall be specified**

NOTE Typical documents submitted as a user inquiry or order are user specifications, industry specifications, (such as ISO and API specifications), data sheets, meeting notes and supplemental agreements.

3 Terms, Abbreviated terms and Definitions

3.1 Terms and definitions

3.1.1

anchor bolts

bolts used to attach the mounting plates to the support structure (concrete foundation or steel structure)
c.f. hold-down bolts (3.1.11)

3.1.2

axially split joint

joint split with the principal face parallel to the shaft centerline

3.1.3

cartridge bundle assembly (centrifugal)

assembly consisting of the complete compressor assembly minus the casing

NOTE It includes the inner barrel assembly, end heads, seals, bearing housings and bearings. It also includes the rotor assembly. It is designed to be shop assembled, ready for insertion into the casing to minimize installation work in the field.

3.1.4

certified point

point to which the performance tolerances will be applied

NOTE This is usually the normal operating point and vendors will normally require that this point is within their preferred selection range.

3.1.5

compressor section

series of one or more impellers with defined external process conditions (i.e., side streams, bypassing or injection)

3.1.6

compressor rated point

intersection on the 100 % speed curve corresponding to the highest capacity of any specified operating point

NOTE This is generally a derived point rather than an actual operating point (see Figure 1 in ISO 10439-2 for a graphical representation).

3.1.7

critical speed

shaft rotational speed at which the rotor-bearing-support system is in a state of resonance

3.1.8

design

manufacturers' calculated parameter

NOTE This is a term used by the equipment manufacturer to describe various parameters such as design power, design pressure, design temperature, or design speed. It is not intended for the purchaser to use this term